



US006396952B1

(12) **United States Patent**
Horikawa et al.

(10) **Patent No.:** **US 6,396,952 B1**
(45) **Date of Patent:** ***May 28, 2002**

(54) **COMPUTER ANIMATION GENERATOR**

(75) Inventors: **Junji Horikawa**, Tokyo; **Takashi Totsuka**, Chiba, both of (JP)

(73) Assignee: **Sony Corporation (JP)**

(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **09/366,549**

(22) Filed: **Aug. 4, 1999**

Related U.S. Application Data

(63) Continuation of application No. 08/755,129, filed on Nov. 25, 1996, now Pat. No. 5,963,668.

(30) **Foreign Application Priority Data**

Dec. 18, 1995 (JP) 7-348403

(51) Int. Cl.⁷ **G06K 9/46**

(52) U.S. Cl. **382/203; 382/266; 345/420**

(58) Field of Search **382/203, 266; 395/141, 119; 345/420, 421, 434**

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,152,766 A 5/1979 Osofsky et al. 364/515
4,600,919 A 7/1986 Stern 395/175
4,694,407 A 9/1987 Ogden 364/518

4,783,829 A 11/1988 Miyakawa et al. 382/22
4,969,204 A 11/1990 Melnychuck et al. 382/56
5,029,228 A 7/1991 Nonoyama et al. 382/56
5,159,512 A * 10/1992 Evans et al. 345/419
5,276,786 A 1/1994 Long et al. 395/128
5,341,466 A 8/1994 Perlin et al. 395/139
5,373,375 A 12/1994 Weldy 358/523
5,384,904 A 1/1995 Sprague et al. 395/139

(List continued on next page.)

OTHER PUBLICATIONS

Mesh Optimization; Computer Graphics Proceedings, Annual Conference Series, 1993 Hoppe et al.; pp. 19-26.
Re-Tiling Polygonal Surfaces; Computer Graphics, 26, Jul. 2, 1992; Greg Turk; pp. 55-64.

An Adaptive Subdivision Method for Surface-Fitting from Sampled Data; Schmitt et al.; SIGGRAPH '86; vol. 20, No. 4, 1986; pp. 179-188.

Primary Examiner—Jose L. Couso

Assistant Examiner—Anh Hong Do

(74) Attorney, Agent, or Firm—Rader, Fishman & Grauer PLLC; Ronald P. Kananen

(57) **ABSTRACT**

Polygonal data input in a first step is subjected to evaluation in which all edges of the polygon data are ranked in importance on the basis of a volume change caused by removal of that edge. The edges are sorted on the basis of an evaluation value in a third step. In a fourth step, the edge of a small evaluation value is determined to be an edge of a small influence on the general shape and is removed. In a fifth step, a new vertex is determined from the loss of vertex by the edge removal. In a sixth step, a movement of texture coordinates and a removal of the texture after the edge removal are executed on the basis of the area change of the texture due to the edge removal by a predetermined evaluating function. In a seventh step, by repeating the processes in the second to sixth steps, a polygon model approximated to a desired layer can be obtained.

304 Claims, 15 Drawing Sheets

